



# IOT BASED VEHICLE THEFT DETECTION AND ACCIDENT DETECTION USING GSM AND GPS

<sup>1</sup> Parucchuri Manoj Kumar, <sup>2</sup>Dr.P.Janardhan Sai Kumar, <sup>3</sup>S.Hima Bindu

<sup>1</sup>M.tech Scholar, Dept. Of ECE,Audisankara College of Engineering and Technology, Gudur, Andhra Pradesh

<sup>2</sup> Professor, Dept. Of ECE,Audisankara College of Engineering and Technology, Gudur, Andhra Pradesh

<sup>3</sup> Associate Professor, Dept. Of ECE,Audisankara College of Engineering and Technology, Gudur, Andhra Pradesh

## ABSTRACT

Due to an exponential increase in vehicle traffic, maintaining a sufficient flow of traffic has become difficult, particularly in major metropolitan areas like Bengaluru and Chennai. Additionally, fuel consumption and transportation costs rise as a result of the higher traffic density. Traffic congestion is a major cause of road accidents that can result in fatalities or serious injuries to other road users. Vehicle theft is now a problem in many places, including parking lots and other unsecured areas. This paper aims to monitor and detect a stolen vehicle and an accident using the Global Positioning System (GPS) and Global System for Mobile Communication (GSM) along with an Arduino. The vehicle's location is tracked using latitude and longitude coordinates, and the owner of the vehicle or the traffic control room receives the information. The proposed system helps to reduce the time factor and identify the location of the vehicles faster.

Using an Arduino Uno, a vibration sensor, a fire and alcohol sensor, a GPS module, a GSM module, a DC motor, and a motor driver, this paper simulates the detection of vehicle theft and accidents. If there is an accident/vehicle theft, the software module detects it based on the data collected from sensors and the GPS module. The location of the place will be sent to the relatives of the vehicle owner, traffic control room, or ambulance at hospitals to treat the victim in a short time with the GSM modules.

## INTRODUCTION

The development in the field of automobiles is highly increasing and which leads to the accidents and so many hazards due to traffic. People's life are under high risk. This situation prevails, just because there is a lack of emergency facilities in our country. In our country, many people loose their life with accidents. Because of causalities or improper communication to rescue team. We are currently working toward resolving this issue by presenting an effective solution and attempting to minimize fatalities. In our theory, the design of the system help us to detect accidents in significantly less time and transfer the fundamental informations to the first aid centre within a few seconds covering the geographical coordinates, the time and the angle where the vehicle had met with an accident. Within a short period of time, this alert message is sent to the rescue team (ambulance) and the family. This real time application saves many valuable lives . The message is sent through the GSM module and the location of the The basic idea is to localize the vehicle system by receiving the real time position of the vehicle through GPS and send the information through GSM module via SMS service with an added feature of GPRS transmission to the monitoring center through usage of internet [M.AL-Rousan, A. R. AI-Ali and K. Darwish et al, 2004]. This project was designed with AT89S52. It used EEPROM to store the phone numbers. accident is detected with the help of the GPS module. With the assistance of both a vibration sensor and a micro electro mechanical system (MEMS) sensor, the

accident can be precisely identified. The MEMS sensor can also send a message that tells you the angle at which the car rolls over. This application provides the optimum solution to poor emergency facilities provided to the roads accidents in the most feasible way.

At present criteria, we cannot detect where the accident has occurred and hence no information related to it, leading to the death of an individual. The research work is going on for tracking of the vehicle even in dark clumsy areas where there is no network for receiving the signals. A number of proposals have been made in the literature to monitor the vehicle's precise real-time positioning and information using various technologies to provide security and safety. A good survey of using GPS, GSM and GIS has been provided in [IoanLita, Ion BogdanCioc, Daniel AlexandruVisan et al, 2006] and [Mrs. RamyaKulandaivel, P.Ponmalar, B.Geetha, G.Saranya et al, 2012]. The general mechanism is to provide the real time geograph- ical position of a vehicle using GPS receiver and send this information to GSM center through configurable software, this is all done by the monitoring center which is working as a control unit that is connected not only by an optical cable but also connected wirelessly through TCP/IP protocols. According to IoanLita, Ion BogdanCioc, Daniel AlexandruVisan et al. (2006), the monitoring center displays real-time vehicle information on an electronic map using a GIS system and distributes the data to the client in a format that is easy to understand. It also stores travel records. Another approach is that vehicle terminal includes a GPS receiver which extracts information about position through GPS satellites and sends it through GSM network and to the control center which reads.

## II.EXISTING SYSTEM:

Manual Detection System :

In this method, accident is detected from

- motorist report
- transportation department
- public crews report

-aerial surveillance

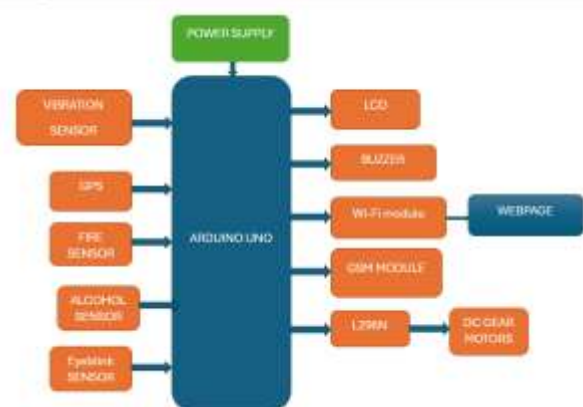
-close circuit camera surveillance

The drawback of this type of detection system is that someone has to witness the incident. Driver initiated detection system. Moreover, there are delays and inaccuracies due to the expression problem of the witness.

## III.PROPOSED SYSTEM:

This proposed IOT based accident detection system helps to reduce the loss of life due to accidents and also reduces the time taken by the ambulance to reach the hospital. To detect the accident there is vibration sensor present in this rescue system and the WIFI module included sends messages about the location to the respective guardian and rescue team.

With the help of vibration sensor signal, a severe accident due to an obstacle can be recognized. In this paper, vehicle theft detection and accident detection is simulated to detect the stolen vehicles and accidents using, Arduino Uno, vibration sensor, fire and alcohol sensor, GPS module, GSM module, DC motor, and motor driver. If there is an accident/vehicle theft, the software module detects it based on the data collected from sensors and the GPS module. The location of the place will be sent to the relatives of the vehicle owner, traffic control room, or ambulance at hospitals to treat the victim in a short time with the GSM modules.



## IV. MODULE DISCRPTION

### a. ARDUINO UNO:

The open-source microcontroller card known as Arduino Uno is based on the organization's Microchip ATmega328P microcontroller. The card has both complicated and simple information/yield (I/O) pin groups that can be connected to other development cards (safety) and different circuits. It has six simple I/O sticks and 14 advanced I/O pins, six of which have PWM yield work. It can be modified using the Arduino IDE (Integrated Development Environment) via a USB Type B cable. It can be powered by a USB link or a 9-volt battery from the outside, but it can accept voltages between 7 and 20 volts. It is similar to Leonardo and the Arduino Nano. Similar to the Creative Commons Attribution 2.5 license, the equipment reference configuration has been granted permission. It could very well be on the Arduino website. For some equipment adaptations, plan and assembly documents are also available.

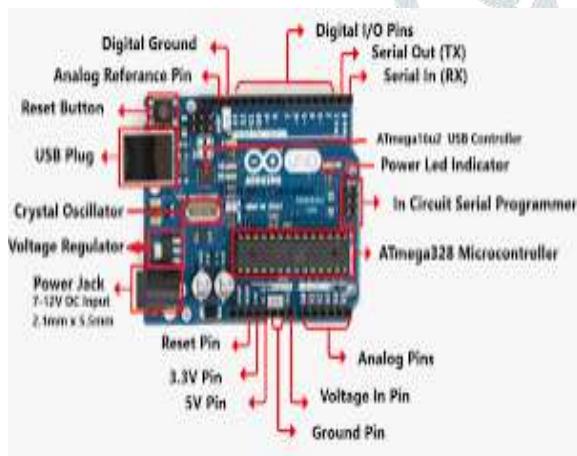


Fig 1: Hardware component Aurdino uno

### b. ESP8266 Wi-Fi Module

An ESP8266 Wi-Fi module is a SOC microchip mainly used for the development of end-point IoT ([Internet of things](#)) applications. It is referred to as a standalone wireless transceiver, available at a very low price. It is used to enable the internet connection to various applications of embedded systems.

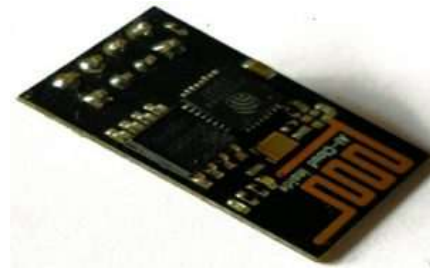


Fig 2:ESP8266 Wi-Fi Module

It can work as either a slave or a standalone application. If the ESP8266 Wi-Fi runs as a slave to a microcontroller host, then it can be used as a Wi-Fi adaptor to any type of microcontroller using UART or SPI. If the module is used as a standalone application, then it provides the functions of the microcontroller and Wi-Fi network.

### c. GSM MODULE:

The SIM900A is a ready-to-use GSM/GPRS module used in many mobile phones and PDAs. This feature can also be used to develop IoT (Internet of Things) and embedded applications. The SIM900A is a dual-band GSM/GPRS device operating at EGSM 900MHz and DCS 1800MHz. The SIM900A includes multiple GPRS Class 10/Class 8 slots (optional) and supports GPRS CS-1, CS-2, CS-3 and CS-4 coding schemes.



Fig 3: GSM Module

### d. GPS MODULE:

A GPS (Global Positioning System) module called NEO-6MV2 is used for navigation. This module simply determines its longitude and latitude by checking its position on the ground. In a small package measuring just 16 x 12.2 x 2.4 mm, this straightforward and inexpensive transmitter provides numerous connectivity options. The NEO-6 module is

ideal for low-cost and space-saving mobile devices due to its compact architecture, power supply, and memory options. The NEO-6MV2 has excellent navigational performance due to its innovative design, even in the most challenging environments.



Fig 4: GPS Modem

## RESULTS:

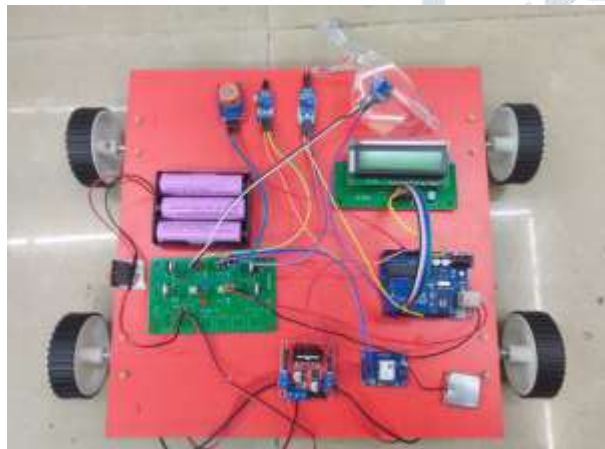


Fig 5: Hardware Implementation

## V.CONCLUSION

The Proteus software, Arduino Uno, GSM, GPS, DC motor, vibration, and MEMS sensors are used in this paper to implement vehicle theft and accident detection software. A vehicle theft detection system identifies unauthorized vehicle accesses. Accident detection system detects sudden changes in vehicle motions or impacts. GPS, GSM, and an Arduino Uno are used to track the vehicle's location. This enables faster responses and increases the chances of recovering the stolen vehicles and contacting nearby hospitals for assistance. The hardware implementation of the proposed system will be the future focus of this paper. The use of artificial intelligence and machine learning algorithms can significantly improve the accuracy and efficiency of accident detection and vehicle theft prevention.

## REFERENCES

- [1] IAATI Car Theft Statistics 2022. [Online]. Available: <https://www.iaati.org/news#:~:text=Car%20Theft%20Statistics%202022&text=Vehicle%20theft%20is%20up%2011.8,19%20pandemic%20and%20an%20economic%E2%80%A6>.
- [2] The Economic Times 2023 [Online]. Available: <https://economictimes.indiatimes.com/news/india/road-accidentstop-cause-for-youths-kids-death-globally-india-loses-1-5-millionlives-every-year-ficci-ey-report/articleshow/101865011.cms>.
- [3] The Times of India. 2022 [Online]. Available: <https://timesofindia.indiatimes.com/india/mumbai-bengaluru-delhiin-top-10-world-cities-in-traffic-congestion-indicating-revival-ofeconomic-activities/articleshow/80246426.cms>.
- [4] U. Farooq, H. M. Atiq, M. U. Asad, A. Iqbal, and Z. Azmat, "Design and Development of an Image Processing Based Adaptive Traffic Control System with GSM Interface," in Second International Conference on Machine Vision, IEEE, 2009, pp. 166-171.
- [5] Khushi, "Smart Control of Traffic Light System using Image Processing," in International Conference on Current Trends in Computer, Electrical Electronics and Communication (CTCEEC), IEEE, 2017, pp. 99-103.
- [6] Shubham Sahu, Dipanjan Paul, and S. Senthilmurugan, "Density based traffic signal control using Arduino and IR sensors," International Journal of Novel Research and Development (IJNRD), vol. 3, no 4, pp. 73-76, 2018.
- [7] A. Muthupalaniappan, B. Nair, S. Rajan, R. Arumuga, and K. Raghesh Krishnan, "Dynamic Control of Traffic Signals using Traffic Data from Google Maps and Road Cameras," International Journal of Recent Technology and Engineering (IJRTE), vol. 8, pp. 686-690, 2019.
- [8] G. R. Nagarjuna, R. Shashidhar, S. B Puneeth, and B. N Arunakumari, "IoT Enabled Smart Traffic System for Public and Emergency Mobility in Smart

City,” in Fourth International Conference on I-SMAC, IEEE, 2020, pp. 53-59.

[9] Prof. Paras Gosai and Jay Joshi, “Automatic Speed Limit Violation Detection and Warning System Using GPS and GSM Modem,” International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, vol. 5, no 3, pp. 1585-1589, 2016.

[10] Viplove Rohille and Monica Bazzad, “Arduino based Vehicle accident detection system,” International Journal for Technological research in Engineering, vol. 6, no 8, pp. 5241-5242, 2019.

[11] Ms. Kavitha, V. Kakade, K. Mahalakshmi, K. Manju, S. Manjula Devi, and S. Nivetha, “IoT Based Automatic Vehicle Accident And Theft Detection System,” International Research Journal of Engineering and Technology (IRJET), vol. 6, no 2, pp.573-575, 2019.

[12] G. Sathya, S. Fathima Shameema, Jyothi Mol Sebastian, and K.S. Jemsya, “Automatic Rescue System for Ambulance and Authoritative Vehicles,” International Journal of Engineering Research & Technology (IJERT), vol. 2, pp. 773-777, 2013.

